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EXAMINER	
TABATABAI, ABOLFAZL	

ART UNIT	PAPER NUMBER
2625	

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/040,594	NIXON ET AL.	
	Examiner	Art Unit	
	Abolfazl Tabatabai	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 January 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *Jauary 7, 2002* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 23 is objected to because of the following informalities:

In claim 23, line 7, delete " (e) " insert--- (c) ---.

In claim 23, line 8, delete " (f) " insert--- (d) ---.

In claim 23, line 9, delete " (g) " insert--- (e) ---.

In order to have all of the steps in sequential order.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 8, 9,15 are rejected under 35 U.S.C. 102(b) as being anticipated by Krumes et al (U S 5,465,142).

Regarding claim 1, Krumes discloses a passive obstacle detection system comprising:

an infrared imaging system that acquires images (column 6, lines 2-12);

a software system that processes images acquired by the infrared imaging system (column 6, lines 54-60); and,

a crew interface that displays the images processed by the software system (column 21, lines 49-61), wherein the software system further comprises cellular

automata routines that propagate pixels along a line according to a set of local rules (column 20, lines 1-10), thereby producing line segments (column 21, lines 22-25) that are linked and presented on the crew interface as obstacles (column 3, lines 42-50).

Regarding claim 2, Krumes discloses the passive obstacle detection system of claim 1, wherein the software system further comprises a function to generate a field of direction vectors (column 17, lines 25-31).

Claim 8 is similarly analyzed as claim 1 above.

Claim 9 is similarly analyzed as claim 2 above.

Regarding claim 15, Krumes discloses a passive obstacle detection system comprising:

an infrared imaging system that acquires images (column 6, lines 2-12); and,

a software system that processes images acquired by the infrared imaging system (column 6, lines 54-60);

wherein the software system further comprises cellular automata routines that propagate pixels along a line according to a set of local rules (column 20, lines 1-10), thereby producing line segments (column 21, lines 22-25) that are linked and determined to be obstacles such that aircraft flight controls are automatically adjusted according to the obstacles (column 2, lines 25-39).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

> the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 3, 7,10,14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krumes et al (U S 5,465,142) in view of Choate et al (U S 5,422,828).

Regarding claim 3, Krumes is silent about the specific details wherein the function to generate a field of direction vectors further comprises partial directional derivatives of pixels within the images.

In the same filed of endeavor, however, Choate discloses method and system for image-sequence-based target tracking and range estimation comprising the function to generate a field of direction vectors further comprises partial directional derivatives of pixels within the images (column 9, lines 42-45).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use partial directional derivatives of pixels within the images as taught by the Choate in the system of Krumes because Choate provides Krumes an improved system that overcomes many of the limitations associated with known passive

ranging systems. This system may be used to build accurate target tracking and range estimation that employ passive ranging and target tracking.

Regarding claim 7, Krumes is silent about the specific details regarding the passive obstacle detection system of claim 1, wherein the line segments are of a sub-pixel resolution.

In the same filed of endeavor, however, Choate discloses method and system for image-sequence-based target tracking and range estimation comprising the function to generate a field of direction vectors further comprises the line segments are of a sub-pixel resolution (column 9, lines 37-45).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the line segments are of a sub-pixel resolution as taught by the Choate in the system of Krumes because Choate provides Krumes an improved system that overcomes many of the limitations associated with known passive ranging systems. This system may be used to build accurate target tracking and range estimation that employ passive ranging and target tracking.

Claim 10 is similarly analyzed as claim 3 above.

Claim 14 is similarly analyzed as claim 7 above.

6. Claims 4,5,11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krumes et al (U S 5,465,142) and Choate et al (U S 5,422,828) as applied to claim 2 and further in view of Demaine et al (U S 4,015,235).

Regarding claim 4, Krumes and Choate are silent about the specific details regarding the passive obstacle detection system of claim 2, wherein the function to

generate a field of direction vectors further comprises a vertical mask and a horizontal mask to form a magnitude image.

In the same filed of endeavor, however, Demaine discloses aircraft parking guidance indicator comprises a vertical mask (column 5, lines 57-61) and a horizontal mask to form a magnitude image (column 5, lines 1-6).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use vertical mask and horizontal mask as taught by the Demaine in the system of Krumes because Demaine provides Krumes an improved system for the guidance of ground-maneuvering aircraft. This system is readily adaptable to the guidance of aircraft laterally relative to a given correct approach path.

Regarding claim 5, Krumes and Choate are silent about the specific details regarding the passive obstacle detection system of claim 2, wherein the function to generate a field of direction vectors further comprises pseudo colors that are indicative of direction.

In the same filed of endeavor, however, Demaine discloses aircraft parking guidance indicator comprises pseudo colors (column 2, lines 26-31).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use pseudo colors as taught by the Demaine in the system of Krumes because Demaine provides Krumes an improved system for the guidance of ground-maneuvering aircraft. This system is readily adaptable to the guidance of aircraft laterally relative to a given correct approach path.

Claim 11 is similarly analyzed as claim 4 above.

Claim 12 is similarly analyzed as claim 5 above.

7. Claims 6 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krumes et al (U S 5,465,142) in view of Lyke (U S 6,215,327 B1).

Regarding claim 6, Krumes is silent about the specific details regarding the passive obstacle detection system of claim 1, wherein the cellular automata routines further comprise a Game of Life model.

In the same filed of endeavor, however, Lyke discloses molecular field programmable gate array comprises a Game of Life model (column 24, lines 44-46).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a Game of Life model as taught by the Lyke in the system of Krumes because Lyke provides Krumes an improved system with a dual benefit such as the ability to use a cellular automata-inspired approach as a general digital implementation fabric, and the other benefit is that in those cases where the nature of cellular automata behavior is advantageous, the system is uniquely able to exploit that relationship.

Claim 13 is similarly analyzed as claim 6 above.

8. Claims 16,18 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al (U S 6,456,226 B1) in view of Raimondi et al (U S 4,267,562).

Regarding claim 16, Zheng discloses a passive obstacle detection system comprising:

an infrared imaging system that acquires images (column 8, lines 64-66);

a software system that processes images acquired by the infrared imaging system (column 10, lines 3-6); and,

a passive ranging system in communication with the software system (column 10, lines 28-32 and column 12, lines 5-10).

However, Zheng is silent about the specific details regarding the software system further comprises cellular automata routines that propagate pixels along a line according to a set of local rules, thereby producing line segments that are linked and determined to be obstacles such that the passive ranging system assigns a range to the obstacles to reduce the probability of false alarms.

In the same filed of endeavor, however, Raimondi discloses method of autonomous target acquisition comprising the software system further comprises cellular automata routines that propagate pixels along a line according to a set of local rules (column 14, lines 44-49), thereby producing line segments that are linked (column 4, lines 12-15) and determined to be obstacles such that the passive ranging system assigns a range to the obstacles to reduce the probability of false alarms (column 5, lines12-17).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use line segment linking and reducing the probability of false alarm as taught by the Raimondi in the system of Zheng because Raimondi provides Zheng an improved computer system for solving the target acquisition and strike capability problems. A need to minimize the exposure time of the aircraft to enemy fire, yet retain accuracy of direct hits, is solved by the Raimondi's system.

Regarding claim 18, Zheng discloses a method for detection of obstacles, the method comprising the steps of:

(a) generating a field of direction vectors for pixels acquired by an imaging system (column 13, lines 31-40).

However, Zheng is silent about the specific details regarding the steps of:

(b) propagating the pixels along a line using cellular automata techniques to produce line segments;

(c) linking the line segments; and,

(d) presenting the linked line segments as obstacles.

In the same filed of endeavor, however, Raimondi discloses method of autonomous target acquisition comprising the steps of:

(b) propagating the pixels along a line using cellular automata techniques to produce line segments (column 14, lines 44-49);

(c) linking the line segments (column 4, lines 12-15); and,

(d) presenting the linked line segments as obstacles (column 4, lines 12-15 and column 7, lines 41-46).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use line segment linking as taught by the Raimondi in the system of Zheng because Raimondi provides Zheng an improved computer system for solving the target acquisition and strike capability problems. A need to minimize the exposure time of the aircraft to enemy fire, yet retain accuracy of direct hits, is solved by the Raimondi's system.

Regarding claim 23, Zheng discloses a method for detection of obstacles, the method comprising the steps of:

(a) generating a field of direction vectors for pixels acquired by an imaging system (column 13, lines 31-40).

However, Zheng is silent about the specific details regarding the steps of:

(b) propagating the pixels along a line using cellular automata techniques to produce line segments;

(e) linking the line segments;

(f) presenting the linked line segments as obstacles; and (g) assigning a range to the obstacles to reduce the probability of false alarms.

In the same filed of endeavor, however, Raimondi discloses method of autonomous target acquisition comprising the steps of:

(b) propagating the pixels along a line using cellular automata techniques to produce line segments (column 14, lines 44-49);

(e) linking the line segments (column 4, lines 12-15);

(f) presenting the linked line segments as obstacles (column 4, lines 12-15 and column 7, lines 41-46); and,

(g) assigning a range to the obstacles to reduce the probability of false alarms (column 5, lines 12-17).

software system further comprises cellular automata routines that propagate pixels along a line according to a set of local rules (column 14, lines 44-49), thereby producing line segments that are linked (column 4, lines 12-15) and determined to be obstacles

such that the passive ranging system assigns a range to the obstacles to reduce the probability of false alarms (column 5, lines12-17).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use line segment linking and reducing the probability of false alarm as taught by the Raimondi in the system of Zheng because Raimondi provides Zheng an improved computer system for solving the target acquisition and strike capability problems. A need to minimize the exposure time of the aircraft to enemy fire, yet retain accuracy of direct hits, is solved by the Raimondi's system.

9. Claims 17 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al (U S 6,456,226 B1) and Raimondi et al (U S 4,267,562) as applied to claims 16 and 23 above and further in view of Bhane et al (U S 5,128,874).

Regarding claim 17, Zheng and Raimondi are silent about the specific details regarding the passive obstacle detection system of claim 16, wherein the passive ranging system further comprises an optical flow field to indicate whether the obstacle is approaching or moving away from the passive obstacle detection system.

In the same filed of endeavor, however, Bhanu discloses inertial navigation sensor integrated obstacle detection system comprises an optical flow field to indicate whether the obstacle is approaching or moving away from the passive obstacle detection system (column 3, lines 52-60).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use optical flow field as taught by the Bhanu in the system of Zheng because Bhanu provides Zheng an improved system with a combination of

active and passive devices. A passive system has a benefit of covertness, simplicity, reduce cost and ease of manufacture. Obstacle detection using passive sensors permits the use of two fundamental techniques for ranging-binocular stereo and motion stereo (optical flow).

Claim 24 is similarly analyzed as claim 17 above.

10. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al (U S 6,456,226 B1) and Raimondi et al (U S 4,267,562) as applied to claims 18 above and further in view of Choat et al (U S 5,422,828).

Regarding claim 19, Zheng and Raimondi are silent about the specific details regarding the method of claim 18, wherein the function to generate a field of direction vectors further comprises partial directional derivatives of pixels within the images. In the same filed of endeavor, however, Choate discloses method and system for image-sequence-based target tracking and range estimation comprising the function to generate a field of direction vectors further comprises partial directional derivatives of pixels within the images (column 9, lines 42-45).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use partial directional derivatives of pixels within the images as taught by the Choate in the system of Zheng because Choate provides Zheng an improved system that overcomes many of the limitations associated with known passive ranging systems. This system may be used to build accurate target tracking and range estimation that employ passive ranging and target tracking.

11. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al (U S 6,456,226 B1) and Raimondi et al (U S 4,267,562) as applied to claim 18 above and further in view of Demaine et al (U S 4,015,235).

Regarding claim 20, Zheng and Raimondi are silent about the specific details regarding the passive obstacle detection system of claim 2, wherein the function to generate a field of direction vectors further comprises a vertical mask and a horizontal mask to form a magnitude image.

In the same filed of endeavor, however, Demaine discloses aircraft parking guidance indicator comprises a vertical mask (column 5, lines 57-61) and a horizontal mask to form a magnitude image (column 5, lines 1-6).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use vertical mask and horizontal mask as taught by the Demaine in the system of Zheng because Demaine provides Zheng an improved system for the guidance of ground-maneuvering aircraft. This system is readily adaptable to the guidance of aircraft laterally relative to a given correct approach path.

Regarding claim 21, Zheng and Raimondi are silent about the specific details regarding the method of claim 18 wherein the step of generating a field of direction vectors further comprises generating pseudo colors that are indicative of direction.

In the same filed of endeavor, however, Demaine discloses aircraft parking guidance indicator comprises generating pseudo colors that are indicative of direction (column 2, lines 26-31).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use vertical mask and horizontal mask as taught by the Demaine in the system of Zheng because Demaine provides Zheng an improved system for the guidance of ground-maneuvering aircraft. This system is readily adaptable to the guidance of aircraft laterally relative to a given correct approach path.

12. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al (U S 6,456,226 B1) and Raimondi et al (U S 4,267,562) as applied to claim 18 above and further in view of in view of Lyke (U S 6,215,327 B1).

Regarding claim 22, Zheng and Raimondi are silent about the specific details regarding the passive obstacle detection system of claim 1, wherein the cellular automata routines further comprise a Game of Life model.

In the same filed of endeavor, however, Lyke discloses molecular field programmable gate array comprises a Game of Life model (column 24, lines 44-46).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a Game of Life model as taught by the Lyke in the system of Zheng because Lyke provides Zheng an improved system with a dual benefit such as the ability to use a cellular automata-inspired approach as a general digital implementation fabric, and the other benefit is that in those cases where the nature of cellular automata behavior is advantageous, the system is uniquely able to exploit that relationship.

Citation of Relevant Prior Art

13. The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

Ebert et al (U S 5,931,874) disclose universal electrical interface between and aircraft and an associated store providing an screen commands menu.

Garrot et al (U S 6,549,828 B1) discloses aircraft based infrared mapping system for earth based resources.

Farmakis et al (U S 5,714,948) disclose satellite based aircraft traffic control system.

O'Neill et al (U S 6,487,519 B1) disclose system and time-t-intercept determination.

Contact Information

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ABOLFAZL TABATABAI whose telephone number is (703) 306-5917.

The examiner can normally be reached on Monday through Friday from 9:30 a.m. to 7:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Mehta Bhavesh M, can be reached at (703) 308-5246.

Any response to this action should be mailed to:

Assistant Commissioner for Patents
Washington, D.C. 20231

Or faxed to:

(703) 872-9314 (for ***formal*** communications; please mark **"EXPEDITED PROCEDURE"**)

Hand delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA. Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 305-4750

Abolfazl Tabatabai

Patent Examiner

Group Art Unit 2625

December 17, 2004

A-Tabatabai